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Changes in Relative Abunda nce and Size Composition of Sablefish in Coastal Waters of Washington and Oregon, **1979-80**

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16. ABSTRACT
The Oregon landings of nearly 6,000 t from August 1979 through July 1980 apparently reduced stocks of sablefish (Anoplopoma fimbria) significantly; however, nearly 4,000 t of these landings were taken in the August-October 1979 period. Following this 3 month period, catches dropped off sharply, with the January-November 1980 period (11 mo) having reported sablefish landings of approximately 3,528 t. These greatly reduced catches should allow sablefish stocks off Oregon, which the index site data indicated had dropped by 30% between the 1979 and 1980 surveys, to rebuild significantly during 1980, 1981, and 1982, barring sharply increased catches during these years. (Author extracted)

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CHANGES IN RELATIVE ABUNDANCE AND SIZE COMPOSITION OF SABLEFISH IN COASTAL WATERS OF WASHINGTON AND OREGON, 1979-80

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INTRODUCTION

In 1978 the National Marine Fisheries Service's Northwest and Alaska Fisheries Center initiated a long-range research program aimed at monitoring the annual changes in sablefish (Anoplopoma fimbria) abundance and size composition in the northeastern Pacific Ocean. This research was begun in southeast Alaskan waters and was expanded to include Washington and Oregon coastal waters in 1979 and California in 1980. Following a comprehensive cooperative federal-state research plan through 1984 (Hughes 1980), future operations are scheduled for the central Gulf of Alaska, as well as continuing time-series operations in the coastal waters off California, Oregon, Washington, and southeastern Alaska.

Results of the 1978, '79, and '80 surveys of sablefish resource conditions in southeast Alaska have been reported to the fishing industry and the North Pacific Fishery Management Council (Zenger and Hughes 1981). While management of sablefish resources in southeast Alaska is being administered under a fishery management plan, the Pacific Fishery Management Council's west coast groundfish management plan (which includes sablefish), will probably not be in effect until late 1981 or '82. Thus, the 1979-80 surveys of sablefish resource conditions off the Washington and Oregon coast, described in this report, represent initial stages of a long range study on sablefish. Until more annual surveys off Washington and Oregon are conducted, the data in this report must be regarded as preliminary and will not be used for management purposes until the Pacific Fishery Management Council's groundfish management plan (based upon complete data) becomes effective.

BACKGROUND

Between 1958 and 1975, annual sablefish landings off the Washington-oregon-California coast averaged 3,200 metric tons (t) and never exceeded 7,500 t. In 1976, due primarily to a substantial effort by the Republic of Korea, sablefish landings in these areas exceeded 21,000 t. That year also marked the final participation by foreign nationals in the sablefish fishery off the Pacific west coast, resulting in a totally domestic fishery from 1977 to the present.

Primarily as a result of favorable market conditions during the late 1970's, Pacific west coast domestic sablefish landings increased from over 7,200 t in 1976 to over 17,300 t in 1979 (Table 1). During this period, annual California landings ranged between 6,000 and 7,200 t. Unlike the slower but steady growth in the Washington fishery which increased from 640 to 2,600 t during the 1976-79 period, Oregon landings climbed from 507 to 7,600 t during the same period and increased nearly 6,000 t between 1978 and 1979. Landings by all gear types (trap, longline, and trawl) generally increased during the 1976-79 period; however, catches by trap gear from California and, most recently, Oregon have dominated Pacific west coast landings.

Changes in sablefish abundance, monitored by the surveys reported here, occur as a result of -decreases due to harvest by the fishery and natural mortality. Increases due to recruitment of juvenile sablefish onto the fishing grounds and into the fishery also contribute to the changes. Thus, in evaluating annual changes in abundance by surveys, it is important to evaluate: 1) those changes in terms of prerecruit fish which have or will enter the fishery, which are determined during the survey, and 2) changes in terms of harvest removals taken from the population between survey periods. Accordingly, the annual catch data shown in Table 1 were adjusted to the August 1979-July 1980

Table 1 ---Sablefish domestic landings by state and gear type, 1976-79.

Area and gear	Sablefish landings Round weight (t) 1976	1977	1978	1979
Washington				
Trawl	314.2	480.2	676	669
Trap	121.4	358.8	491	435
Longline	203.8	299.2	666	1,564
Troll	1.0	1.8	-	-
Shrimp trawl	0.7	6.5	-	-
Total	641.1	1,146.5	1,833	2,668
Oregon				
Trawl	443.2	326.2	958	1,453
Trap	44.5	40.0	290	4,239
Longline	0	6.0	268	1,836
Troll	-	-	28	-
Shrimp trawl	20.0	13.0	70	77
Total	507.7	385.2	1,614	7,605
California				
Trawl	1,853.6	2,474.1	2,345	2,272
Trap and longline[1/]	4,205.9	3,578.6	4,827	4,772
Total	6,059.5	6,052.7	7,172	7,044
GRAND TOTAL	7,208.3	7,584.4	10,619	17,317

1/ Longline catch reported as very small percentage of total trap-longline catch.

period between the respective 1979 and 1980 surveys. This indicated that Washington sablefish catches in the 12 mo period between August 1979 and July 1980 totaled 2,382 t, Oregon catches during that period were 5,993 t, and that period's combined Washington-Oregon catch totaled 8,375 t.

Favorable sablefish export markets to Japan which prompted the rapid expansion of the domestic fishery in 1977-79 began to deteriorate in June of 1979. Exvessel prices decreased steadily during the late summer and autumn, and by January 1980, minimal market demand had resulted in at least a 50% reduction in exvessel prices since May 1979. Market demand and exvessel prices remained depressed during 1980-81. Coupled with increased fuel costs and greatly reduced fishing effort, sablefish landings off the coasts of Washington, Oregon, and California in 1980 are projected to drop below the 13,400 t maximum sustained yield harvest level recommended in the "Draft Pacific Groundfish Plan."

SURVEY METHODS AND GEAR

The assessment techniques employed in this study are known as "abundance indexing." This assessment method does not estimate stock biomass or absolute fish abundance directly but, rather, monitors year-to-year changes in the relative abundance of adults and their size composition as well as prerecruit strength. Information on the percentage change in abundance from year to year is determined from the catch per unit of effort (CPUE) obtained from standardized trap catches at four established sites off the Washington-Oregon coast which were monitored during August-September 1979 and again in August-September 1980. As an aid to management decisions, reported changes in adult abundance (percentage of increase or decrease) should be viewed in light of the catch that has been removed from the adult stock between survey periods, the strength of prerecruits which have entered the fishery, and those which will be available to the fishery the succeeding year.

During the 1979-80 surveys, abundance index sites on commercial fishing grounds were monitored off the Oregon coast near Cape Arago and Cape Lookout and off the Washington coast near Willapa Bay and Cape Johnson (Figure 1). Sampling gear consisted of 50 identical rectangular collapsible sablefish traps, each measuring 34 in x 34 in x 8 ft (Hipkins 1974). Each trap was equipped with a single tunnel constructed of green 2-l/2 in nylon web and the body was covered with 3-l/2 in white nylon web. To standardize trap fishing time, tunnel entrances were equipped with calibrated, corrodible magnesium clips which closed trap entrances via a noose arrangement after 24 +l h periods in seawater.

Ten traps, each baited with 2 lb of chopped herring in a perforated plastic jar, were fished on a 550 fathom (fm) groundline (Figure 2) with 50 fm spacings between traps. At each index site, a lo-trap string was located as near as possible to the 150, 225, 300, 375, and 450 fm isobaths. Five sets, or repetitions, of the gear at each depth constituted a completed site for a total of 50 traps hauled at each depth interval and 250 traps hauled at each site. Detailed charts using Loran C were prepared and maintained to assure that replicate sets in 1979 and 1980 were fished at the positions initially established. Each year's survey was conducted from the 92 ft NOAA research vessel John N. Cobb beginning with the Cape Arago site off southern Oregon in early August and finishing at the Cape Johnson site off northern Washington during late September.

Data collected during the surveys included:

1. Number and weight of sablefish captured in each trap,
2. Number and weight of other species captured in each trap,
3. Fork lengths of all sablefish;

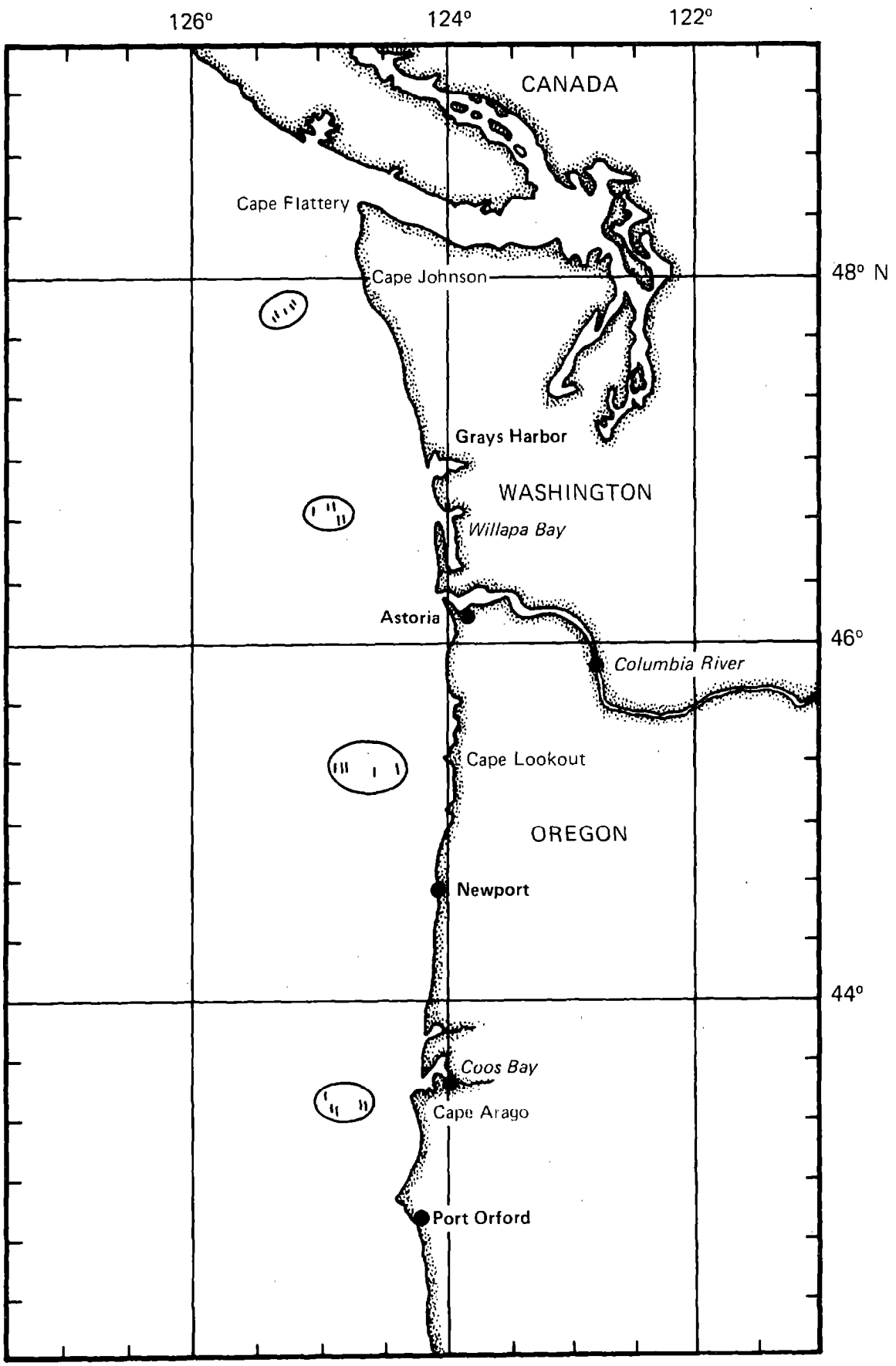

Figure l.--Sites fished off Washington and Oregon during cruises 79-2 and 80-2 of the NOAA research vessel John N. Cobb.

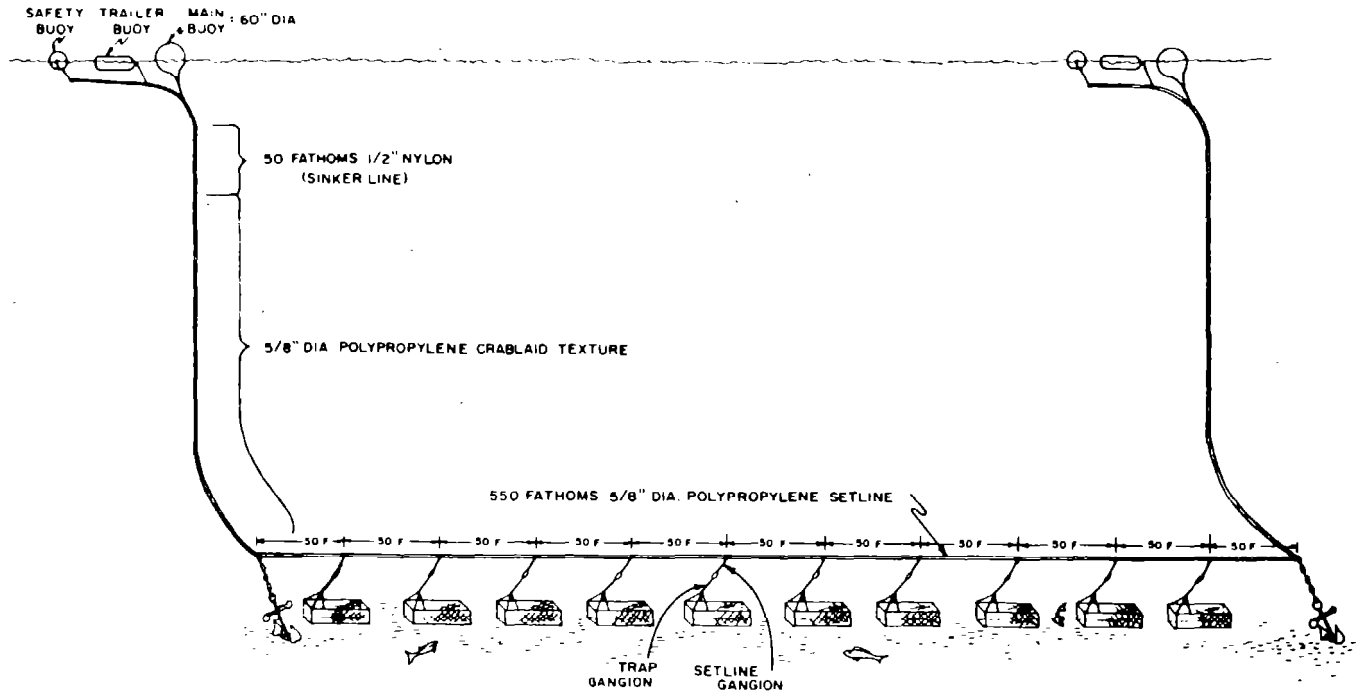

Fig. 2.--A pictorial view of a string of trap gear used in the sablefish index studies.

4. Biological data to support life history studies which included length-weight relationships, age indicators, sex ratio, and sexual maturity:

5. Tissue samples for stock identification studies; and

6. All sablefish not required for biological samples were tagged and released in support of ongoing coastwide migration studies.

Resulting catch data prepared in tables show the 1979 and 1980 total numbers of sablefish and numbers of marketable-size sablefish caught per 10 trap string by set and depth at each site and the percentage increase or decrease in abundance between years sampled. Length composition of prerecruit and marketable-size sablefish captured at each site in 1979 and 1980 are shown in Figures, Because all sablefish were measured each year at each site, the length compositions directly compare the numbers of sablefish obtained by each centimeter length interval. Hence, these data are direct reflections of changes in abundance by centimeter size intervals which occurred at each site between 1979 and 1980.

Based upon information from the sablefish processors of Oregon and Washington, marketable-size sablefish are defined as fish measuring 52 cm or greater in fork length. Fish measuring 52 cm average 3 lb round weight. Prerecruit sablefish are defined as those fish retained by the trap gear which measure 51 cm or less and hence weigh less than 3 lb round weight.

RESULTS

Sablefish abundance index sites in Oregon coastal waters near cape Arago and Cape Lookout and in Washngton coastal waters near Willapa and Cape Johnson were successfully sampled during the August-September survey period in 1979 and again in 1980. Table 2 is a summary of total numbers of sablefish, numbers of marketable-size and prerecruit-size sablefish obtained at each abundance index site during each year's survey and the percentage change in

Table 2.--Total numbers of marketable-size.and prerecruit-size sablefish captured at Oregon and Washington abundance index sites during the 1979-80 surveys. Percentage change in numbers of sablefish between 1979 and 1980 surveys are indicated by site and fish size category.'

Area and Year	Total sablefish Number of fish	Total sablefish 1979-80 change (%)	Marketable-size Number of fish	Marketable-size 1979-80 change (%)	Prerecruit-size Number of fish	Prerecruit-size 1979-80 change (%)
OREGON						
Cape Arago						
1979	1,222		929		293	
1980	1,756	+44	1,012	+9	744	+154
Cape Lookout						
1979	2,874		2,319		555	
1980	1,125	-61	700	-70	425	-23
Cape Arago and Cape Lookout						
1979	4,096		3,248		848	
1980	2,881	-30	1,712	-47	1,169	+38
WASHINGTON						
Willapa						
1979	1,310		846		464	
1980	974	-26	675	-20	299	-36
Cape Johnson						
1979	952		760		192	
1980	1,370	+44	944	+24	426	+122
Willapa and Cape Johnson						
1979	2,262		1,606		656	
1980	2,344	+4	1,619	+1	725	+10
Combined, Oregon and Washington						
1979	6,358		4,854		1,504	
1980	5,224	-18	3,331	-31	1,894	+26

abundance between 1979 and 1980 surveys. The 1979-80 comparison of abundance by length composition from these combined coastal sites is shown in Figure 3.

These generalized composite Oregon-Washington coastal data indicate that, between the August 1979 and July 1980 survey periods when 8,375 t of sablefish were harvested from Oregon-Washington coastal waters, the total sablefish abundance decreased 18%, marketable-size fish abundance decreased 31%, and the prerecruit-size fish abundance increased 26%. **Figure** 3 illustrates the combined Oregon-Washington coast changes in sablefish abundance by size composition which occurred at the four abundance index sites surveyed in 1979-80. As a result of the increased abundance of prerecruits and decreased abundance of marketable-size fish which occurred off the Oregon-Washington coast between 1979 and 1980 surveys, the average sablefish sizes at abundance sites decreased from an average of 57 cm in 1979 to 55 cm in 1980.

Detailed information obtained at each of the four abundance index sites is provided in the following section.

Oregon Coast.--Sablefish abundance at the Cape Arago site off the southern Oregon coast increased 44% between the 1979 and 1980 surveys (Tables 2 and 3). The increased abundance was primarily due to a 154% increase in the abundance of prerecruit-size fish, which are believed to represent a strong 1977 yeas class. The marketable-size portion of fish sampled at Cape Arago increased 9% between the 1979 and 1980 surveys, primarily due to an increased abundance of 52-56 cm fish (aged as 4 and 5-year olds) which were recruited into the fishery after the 1979 sampling (Figure 4). The average size of sablefish was 57 cm in 1979 and dropped to 54 cm in 1980.

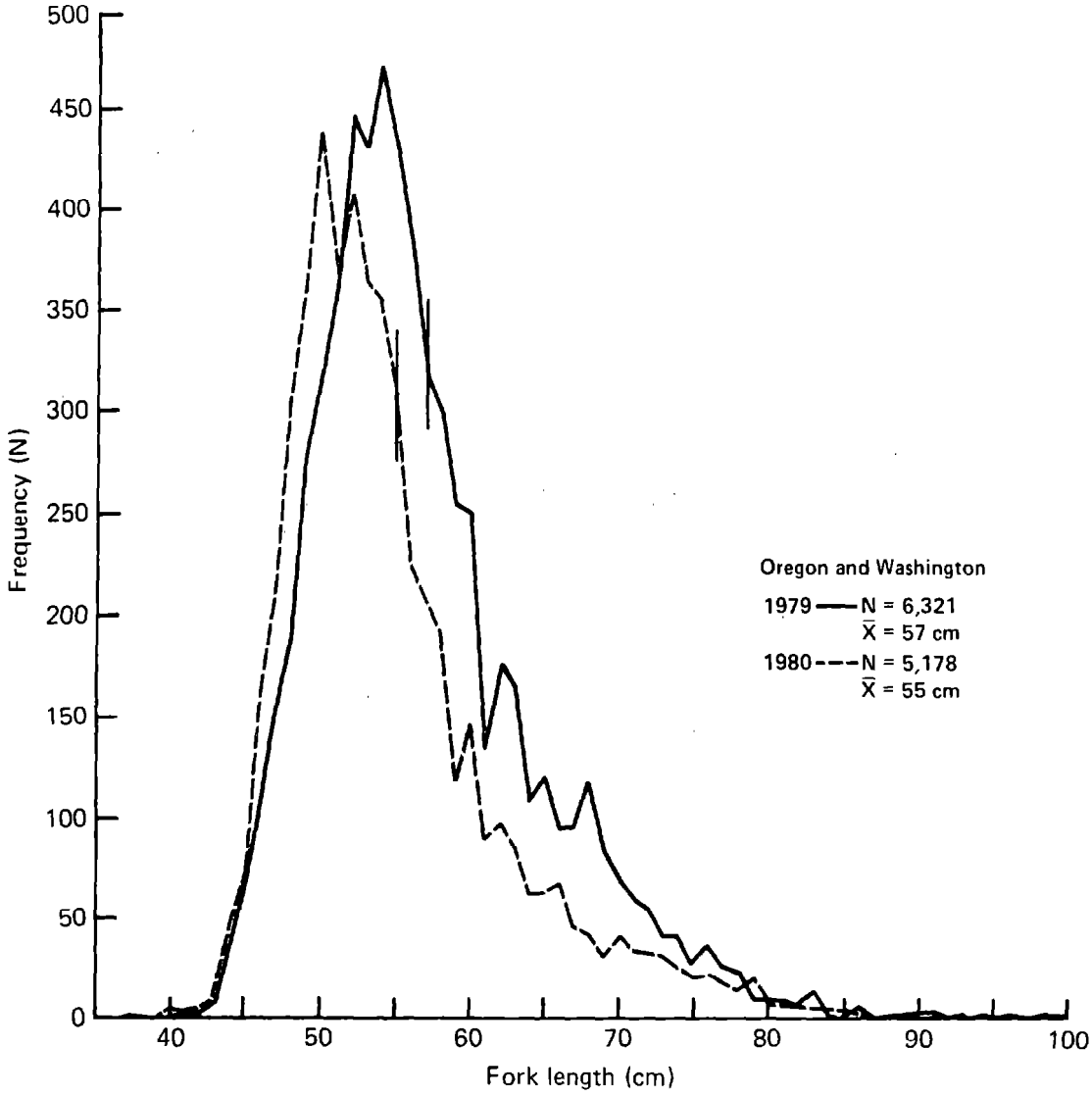

Figure 3. --Combined length composition of all sablefish captured at Oregon and Washington sites during the 1979-80 indexing surveys.

Table 3.--Total numbers of sablefish and marketable-size sablefish 1/ (in parenthesis) captured by depth and set at the Cape Arago, Oregon, site during 1979-80. Each catch was obtained from one string of 10 sablefish traps fished for 24 h.

Year and set	Depth (fathom) 150	225	300	375	450	Total catch
1979	Number of fish					
1	39 (36)	88 (70)	61 (50)	86 (63)	74 (58)	348 (277)
2	39 (19)	54 (42)	42 (35)	26 (21)	34 (31)	195 (148)
3	51 (27)	48 (41)	64 (46)	77 (60)	54 (41)	294 (215)
4	21 (17)	50 (46)	19 (12)	50 (35)	52 (30)	192 (140)
5	22 (11)	33 (30)	21 (11)	33 (30)	84 (67)	193 (149)
Total	172 (110)	273 (229)	207 (154)	272 (209)	298 (227)	1,222 (929)
Mean	34 (22)	55 (46)	41 (31)	54 (42)	60 (45)	244 (186)
1980						
1	171 (70)	54 (30)	40 (19)	36 (19)	20 (14)	321 (152)
2	166 (71)	81 (62)	61 (34)	17 (10)	10 (6)	335 (183)
3	303 (115)	49 (23)	44 (27)	19 (14)	6 (4)	421 (183)
4	150 (127)	86 (66)	51 (38)	15 (10)	9 (5)	311 (246)
5	239 (148)	83 (70)	12 (8)	23 (14)	11 (8)	368 (248)
Total	1,029 (531)	353 (251)	208 (126)	110 (67)	56 (37)	1,756(1,012)
Mean	206 (106)	71 (50)	42 (25)	22 (13)	11 (7)	351 (202)

1/ Sablefish measuring 52 cm or greater in fork length.

The data for the Cape Lookout site off the northern Oregon coast indicate that total sablefish abundance decreased by 61% between the 1979 ,and 1980 surveys (Tables 2 and 4). The prerecruit abundance decreased 23%, whereas abundance of marketable-size sablefish at the Cape Lookout site decreased 70%. Comparing the length composition of Cape Lookout sablefish catches, the numbers of fish measuring 50 cm or less was very similar in 1979 and 1980, while the substantial decrease in 1980 abundance occurred primarily among fish measuring 51-79 cm (Figure 5). The average length of Cape Lookout sablefish decreased from 58 cm in 1979 to 55 cm in 1980.

Combined Cape Arago and Cape Lookout data show that sablefish abundance index site catches totaled 4,096 fish in 1979 and 2,881 fish in 1980, indicating a 30% decrease in stock abundance. Catches of prerecruits, however, increased from 848 in 1979 to 1,169 in 1980 for an increase of 38%. Catches of marketable-size sablefish decreased 47% from 3,248 fish in 1979 to 1,712 fish in 1980 (Table 2). The combined length composition for both Oregon sites (Figure 6) shows this increase in prerecruits and decrease in marketable-size fish. The average length of sablefish for the entire Oregon coast decreased from 57 cm in 1979 to 54 cm in 1980.

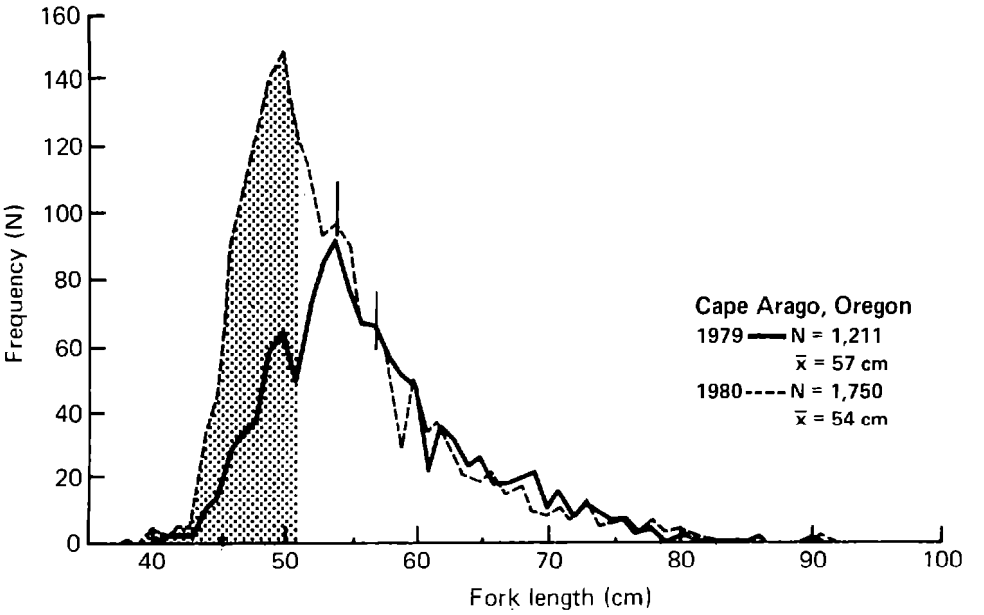

Figure 4. --Length composition of sablefish captured at the Cape Arago, Oregon, site during the 1979-80 indexing surveys.

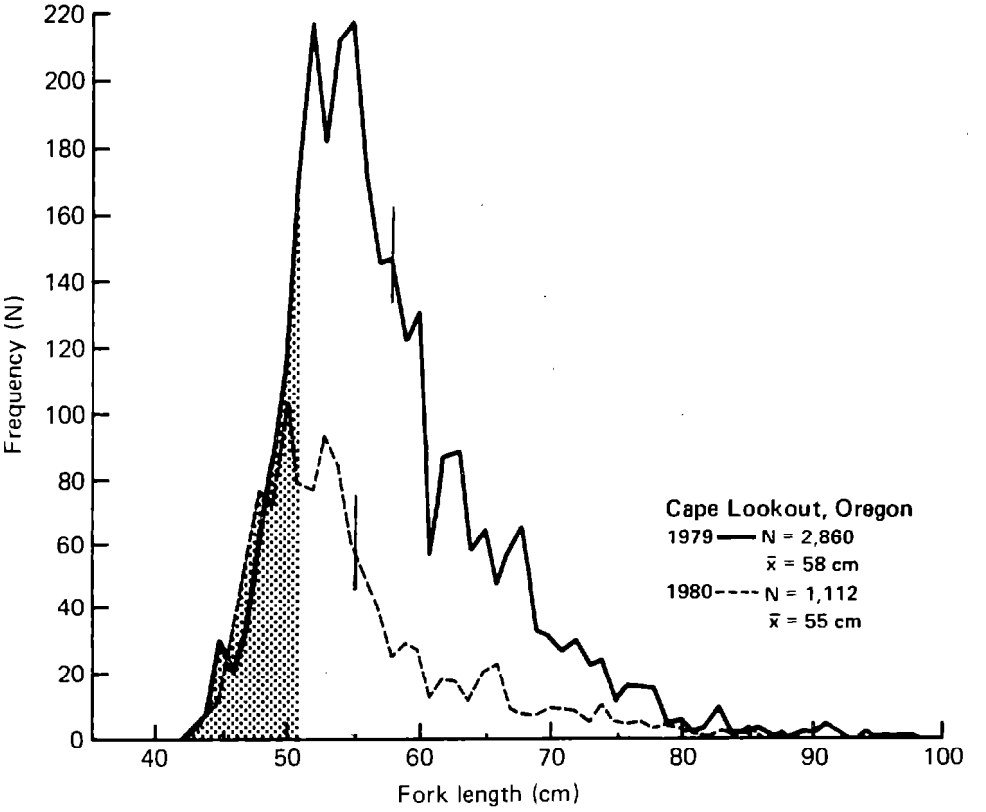

Figure 5. --Length composition of sablefish captured at the Cape Lookout, Oregon, site during the 1979-80 indexing surveys.

Table 4 .--Total numbers of sablefish and marketable-size sablefish 1/ (in parenthesis) captured by depth and set at the Cape Lookout, Oregon, site during 1979-80. Each catch was obtained from one string of 10 sablefish traps fished for 24 h.

Year and set	Depth (fathom) 150	225	300	375	450	Total catch
1979	Number of fish					
1	158 (103)	138 (131)	360 (293)	222 (177)	213 (158)	1,091 (862)
2	30 (24)	72 (68)	134 (111)	87 (74)	132 (106)	455 (383)
3	25 (14)	97 (95)	146 (123)	114 (93)	99 (74)	481 (399)
4	57 (45)	92 (89)	98 (76)	116 (92)	116 (88)	479 (390)
5	23 (16)	85 (65)	66 (54)	83 (67)	111 (83)	368 (285)
Total	293 (202)	484 (448)	804 (657)	622 (503)	671 (509)	2,874(2,319)
Mean	59 (40)	97 (90)	161 (131)	124 (101)	134 (102)	575 (464)
1980						
1	93 (54)	24 (18)	60 (41)	29 (18)	35 (22)	241 (153)
2	55 (35)	26 (20)	95 (59)	28 (15)	23 (16)	227 (145)
3	85 (50)	74 (45)	50 (28)	40 (23)	10 (7)	259 (153)
4	45 (25)	53 (36)	102 (54)	44 (33)	29 (12)	273 (160)
5	28 (18)	30 (28)	23 (14)	27 (20)	17 (9)	125 (89)
Total	306 (182)	207 (147)	330 (196)	168 (109)	114 (66)	1,125 (700)
Mean	61 (36)	41 (29)	66 (39)	34 (22)	23 (13)	225 (140)

1/ Sablefish measuring 52 cm or greater in fork length

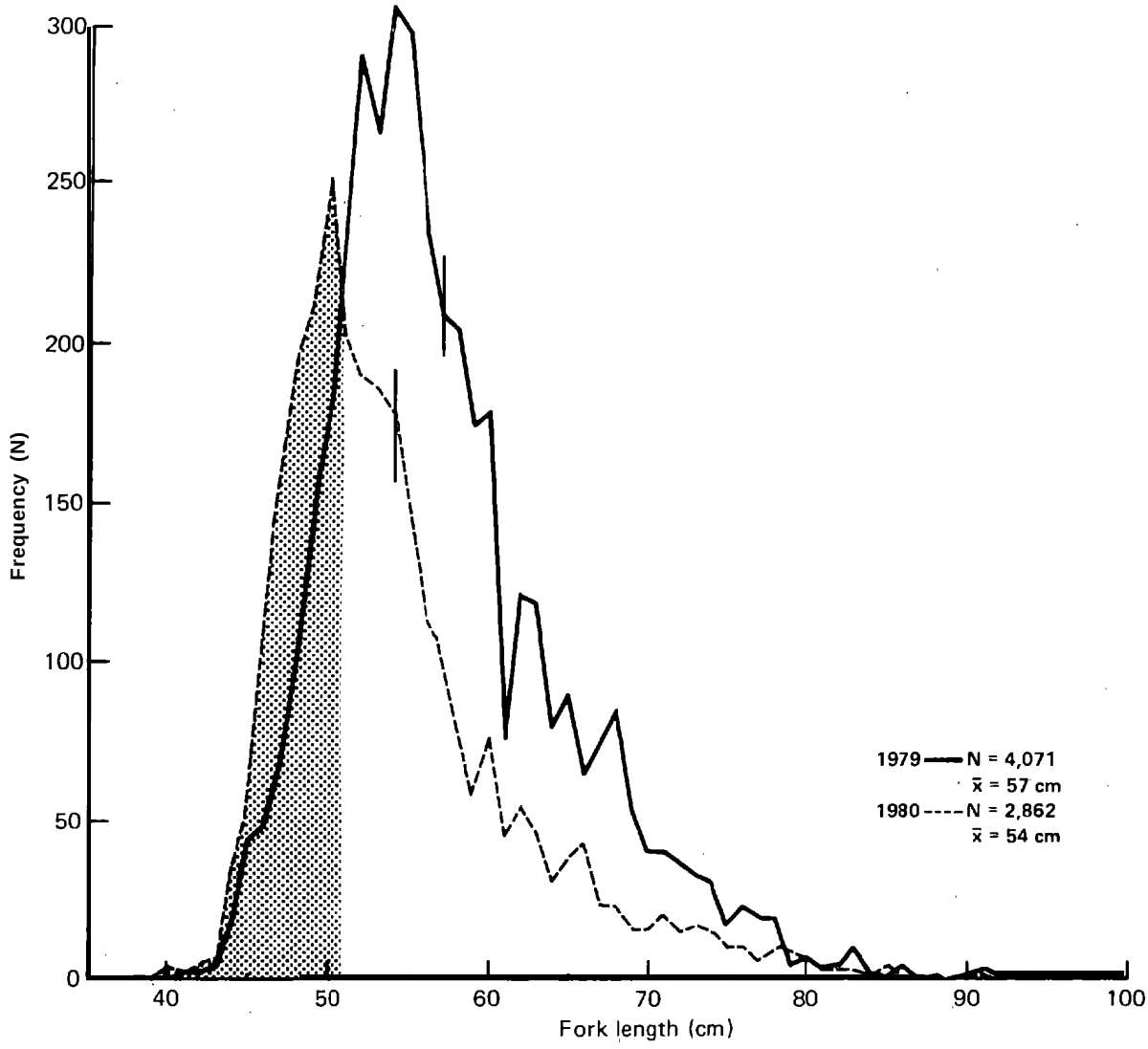

Figure 6.--Combined length composition of sablefish captured at Cape Arago and Cape Lookout sites off Oregon during the 1979-80 indexing surveys.

Washington Coast. --Sablefish abundance at the Willapa Bay site off the southern Washington coast decreased 26% between the 1979 and 1980 surveys (Tables 2 and 5). Catches of prerecruit sablefish in this area totaled 464 fish in 1979 and 299 fish in 1980, indicating a 36% decrease in abundance of 1980 prerecruits compared to 1979 levels. At the same time, the abundance of only marketable-size sablefish decreased 20%. As shown in Figure 7, the greatest decrease in marketable-size fish occurred in the 53-57 cm size range while the abundance of 58-80 cm fish was quite uniform in 1979-80. The average length of all sablefish at the Willapa Bay site increased slightly from 55 to 56 cm.

Contrary to the decreases in abundance noted off southern Washington at the Willapa Bay site, the northern Washington site near Cape Johnson showed increased abundance. Between 1979 and 1980 surveys, total sablefish catches, increased from 952 fish to 1,370 fish for an increase of 44%. Catches of prerecruits totaled 192 in 1979 and 426 in 1980, for an increase of 122% (Tables 2 and 6), and catches of marketable-size sablefish increased 240 from 760 fish in 1979 to 944 fish in 1980. The length composition of the Cape Johnson sablefish (Figure 8) shows that the increased abundance occurred primarily in fish between 42 and 58 cm, whereas fish over 58 cm were slightly less abundant in 1980. The average length of sablefish captured off Cape Johnson decreased from 58 cm in 1979 to 55 cm in 1980.

Table 5.--Total numbers of sablefish and marketable-size sablefish 1/ (in parenthesis) captured by depth and set at the Willapa Bay, Washington, site during 1979-80. Each catch was obtained from one string of 10 sablefish traps fished for 24 hours.

Year and set	Depth (fathom) 150	225	300	375	450	Total catch
1979	Number of fish					
1	34 (18)	80 (24)	102 (81)	109 (81)	184 (106)	509 (310)
2	23 (13)	39 (15)	83 (62)	47 (40)	45 (33)	237 (163)
3	8 (6)	57 (23)	82 (71)	32 (23)	32 (22)	211 (145)
4	18 (12)	27 (8)	29 (18)	48 (35)	56 (42)	178 (115)
5	6 (5)	20 (7)	39 (26)	56 (40)	54 (35)	175 (113)
Total	89 (54)	223 (77)	335 (258)	292 (219)	371 (238)	1,310 (846)
Mean	18 (11)	45 (15)	67 (52)	58 (44)	74 (48)	262 (169)
1980						
1	57 (33)	42 (23)	72 (52)	31 (23)	42 (24)	244 (155)
2	21 (15)	35 (21)	27 (21)	28 (24)	53 (42)	164 (123)
3	59 (37)	54 (42)	42 (35)	32 (29)	56 (36)	243 (179)
4	32 (19)	32 (14)	44 (34)	25 (18)	27 (22)	160 (107)
5	29 (18)	38 (21)	49 (41)	23 (19)	24 (12)	163 (111)
Total	198 (122)	201 (121)	234 (183)	139 (113)	202 (136)	974 (675)
Mean	40 (24)	40 (24)	47 (37)	28 (23)	40 (27)	195 (135)

1/ Sablefish measuring 52 cm or greater in fork length

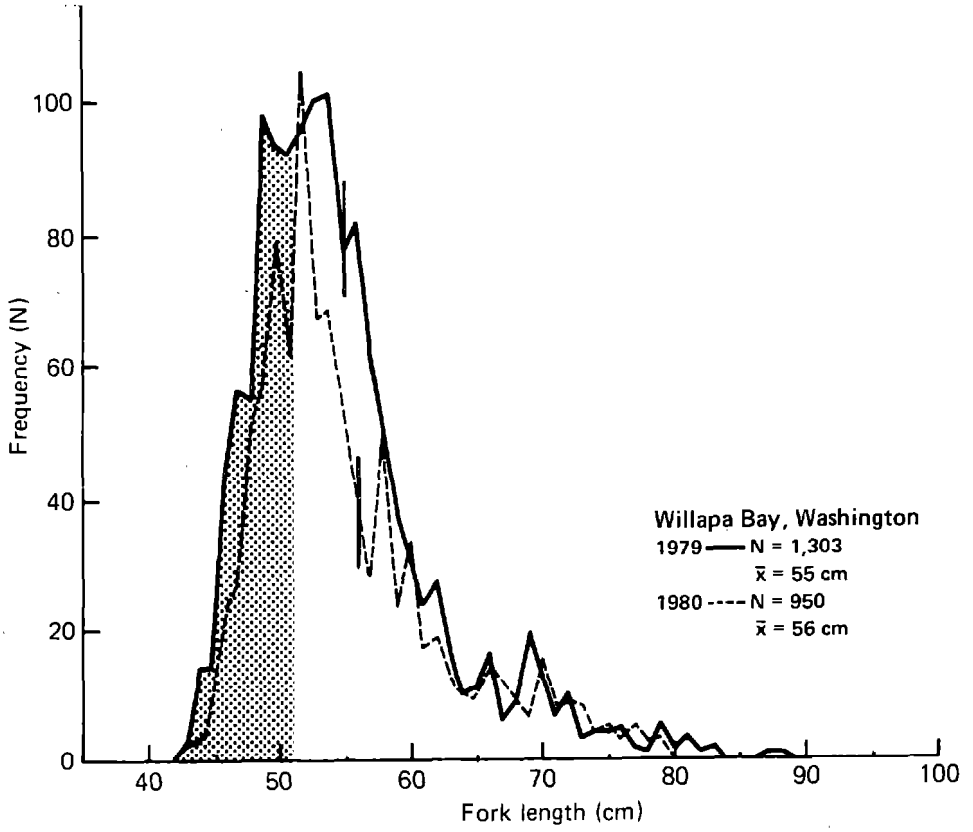

Figure 7. --Length composition of sablefish captured at the Willapa Bay, Washington, site during the 1979-80 indexing surveys.

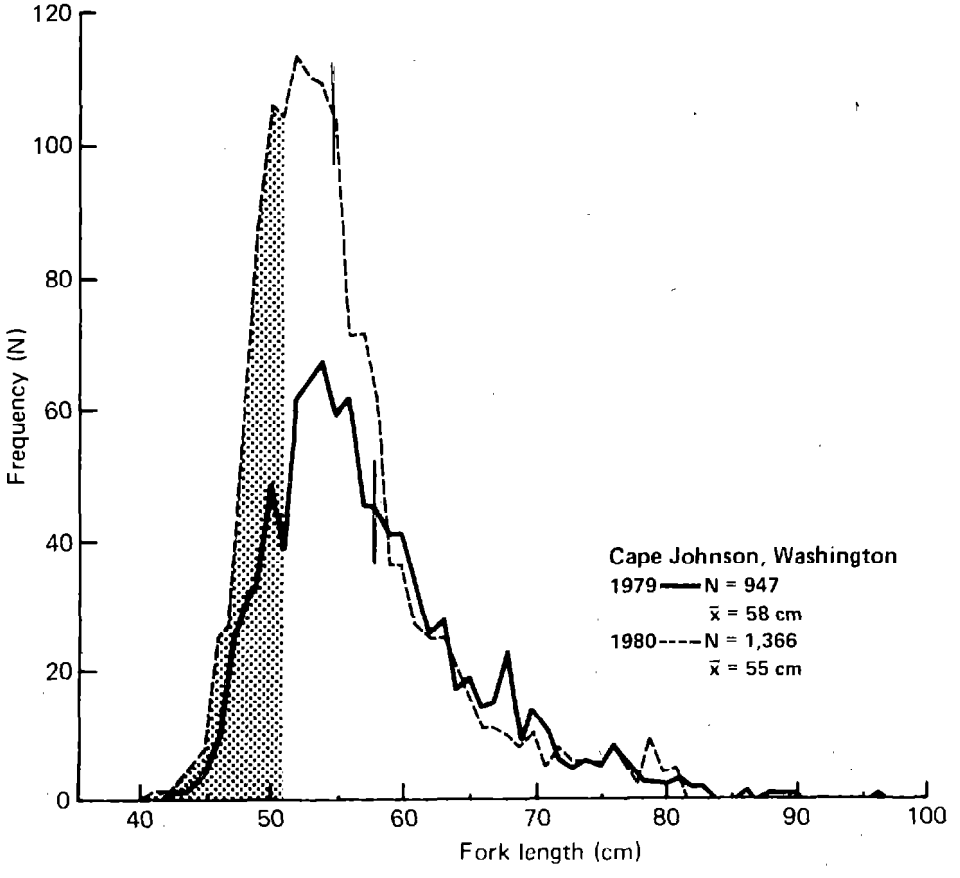

Figure 8. --Length composition of sablefish captured at the Cape Johnson, Washington, site during the 1979-80 indexing surveys.

Table 6.--Total numbers of sablefish and marketable-size sablefish 1/ (in parenthesis) captured by depth and set at the Cape Johnson, Washington, site during 1979-80. Each catch was obtained from one string of 10 sablefish traps fished for 24 h.

Year and set	Depth (fathom) 150	225	300	375	450	Total catch
1979	Number of Fish					
1	30 (22)	30 (23)	24 (21)	79 (51)	72 (59)	235 (176)
2	20 (14)	9 (6)	18 (17)	47 (38)	75 (64)	169 (139)
3	11 (10)	15 (12)	27 (22)	31 (23)	68 (63)	152 (130)
4	27 (22)	10 (7)	16 (14)	28 (20)	93 (76)	174 (139)
5	74 (54)	24 (24)	26 (22)	35 (26)	63 (50)	222 (176)
Total	162 (122)	88 (72)	111 (96)	220 (158)	371 (312)	952 (760)
Mean	32 (24)	18 (14)	22 (19)	44 (32)	74 (62)	190 (152)
1980						
1	7 (6)	69 (52)	54 (33)	45 (24)	58 (52)	233 (167)
2	6 (6)	47 (39)	46 (30)	20 (13)	46 (37)	165 (125)
3	22 (21)	72 (58)	67 (40)	65 (38)	81 (59)	307 (216)
4	15 (11)	99 (86)	52 (33)	34 (25)	77 (50)	277 (205)
5	23 (15)	71 (52)	119 (58)	80 (42)	95 (64)	388 (231)
Total	73 (59)	358 (287)	338 (194)	244 (142)	357 (262)	1,370 (944)
Mean	15 (12)	72 (57)	68 (39)	49 (28)	71 (52)	274 (190)

1/ Sablefish measuring 52 cm or greater in fork length

The data obtained by combining catch information from the Willapa and Cape Johnson sites off the Washington coast (Table 2) indicate stable stock conditions between 1979 and 1980. Washington catches at the abundance index sites totaled 2,262 fish in 1979 and 2,344 fish in 1980, representing a 4% increase in total sablefish abundance. The abundance of prerecruits in 1980 was 10% greater than in 1979 (656 fish vs 725 fish), while the abundance of only marketable-size sablefish (1,606 vs 1,619 fish), indicates less than a 1% increase in their abundance. The very similar sablefish stock composition off the Washington coast in 1979-80 is summarized in Figure 9 where the number of fish captured by centimeter length interval is plotted by year. The average length of sablefish off the Washington coast decreased only slightly from 56 cm in 1979 to 55 cm in 1980.

DISCUSSION

Total sablefish abundance off Oregon decreased 30% between August 1979 and July 1980 according to catches obtained in the 1979 and 1980 index surveys, while during this period domestic sablefish catches off Oregon were approximately 6,000 t. At the same time, prerecruit-size sablefish showed an increase of 380 for both Oregon sites combined. The abundance of the marketable-size component of sablefish decreased by 47%, and the average length of sablefish dropped from 57 to 54' cm (Figure 5). Survey catch rates off the southern Oregon coast (Cape Arago) were up substantially, 44%, 154%, and 9% for total sablefish, prerecruit-size, and marketable-size, respectively, whereas survey catch rates off northern Oregon (Cape Lookout) decreased sharply, 61%, 23%, and 70% for respective sablefish size categories (Tables 2-4). Sablefish distribution by depth off Oregon was markedly different during the 1979-80 surveys. In 1979 catch rates at both Oregon sites generally increased with depth whereas in 1980 catch rates generally decreased with depth.

Landings of approximately 2,400 t of sablefish from Washington coastal waters from August 1979 through July 1980 left total sablefish stocks in relatively stable condition (up 4%) according to catch rates from the 1979-80 indexing surveys. The prerecruit-size and marketable-size components of the catch were also relatively stable, being up 10% and l%, respectively (Table 2). Average length of sablefish dropped only slightly from 56 to 55 cm (Figure 9). Survey catch rates off the southern Washington coast (Willapa Bay) dropped by 26%, 36%, and 20% for total sablefish, prerecruit-size, and marketable-size, respectively, whereas survey catch rates off the northern Washington coast (Cape Johnson) increased by 44%, 122%, and 24% for the above sablefish size categories (Tables 2, 5, and 6).

For all Oregon and Washington sites combined, the 1979-80 surveys showed that total sablefish index of abundance decreased 18%, and the abundance index of prerecruit-size sablefish was up 26%; however, marketable-size sablefish index of abundance decreased 31% (Table 2). Average length decreased from 57 to 55 cm (Figure 3).

SUMMARY AND CONCLUSIONS

The Oregon landings of nearly 6,000 t from August 1979 through July 1980 apparently reduced stocks significantly; however, nearly 4,000 t of these landings were taken in the August-October 1979 period. Following this 3-mo period, catches dropped off sharply, with the January-November 1980 period (11 mo) having reported sablefish landings of approximately 2,528 t. These greatly reduced catches should allow sablefish stocks off Oregon, which our index site data indicated had dropped by 30% between the 1979 and 1980 surveys, to rebuild significantly during 1980, 1981, and 1982, barring sharply increased catches during these years.

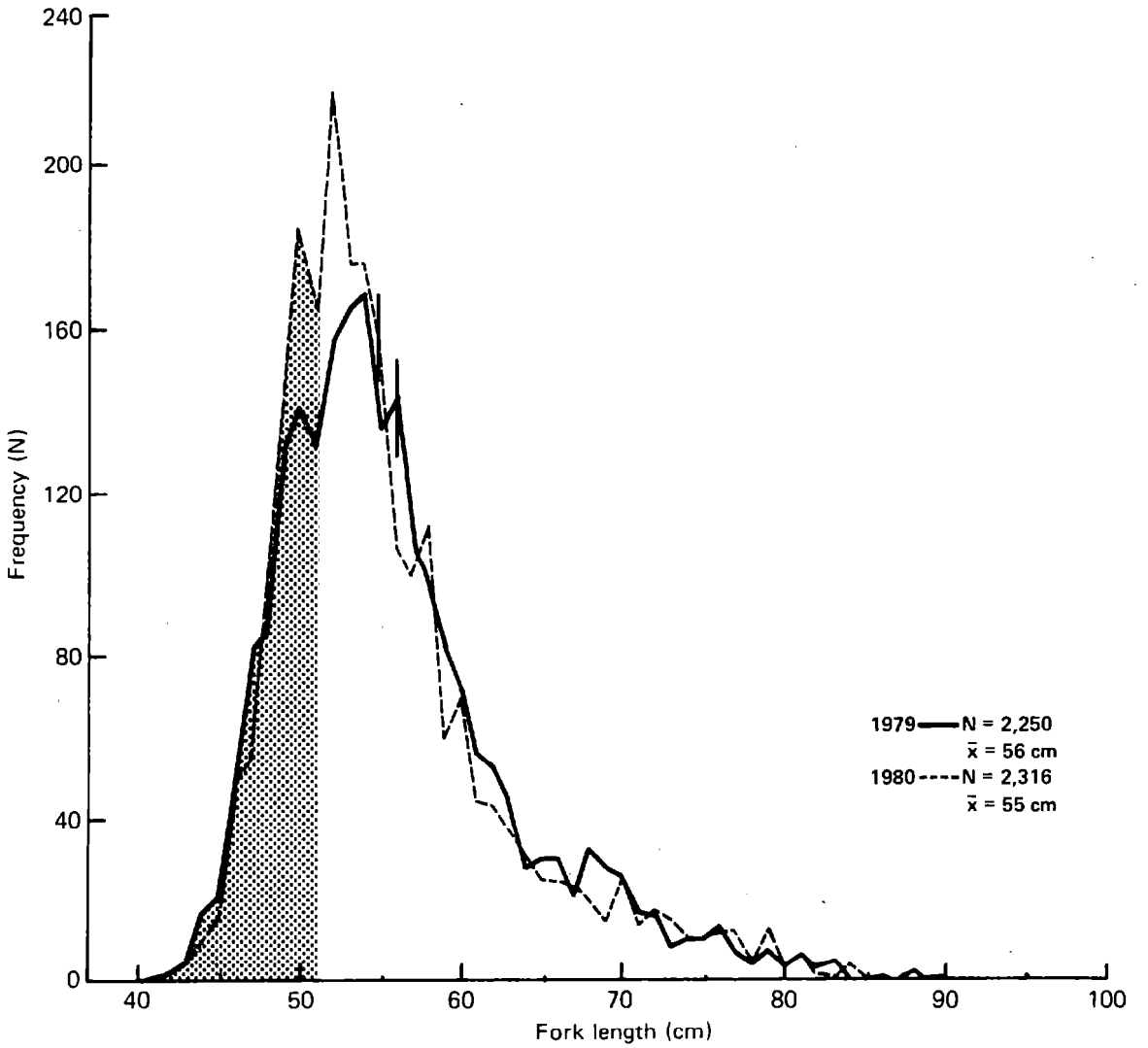

Figure 9. --Length composition of sablefish captured at the Willapa Bay and Cape Johnson sites off Washington during the 1979-80 indexing surveys.

The relatively stable condition of marketable-size sablefish stocks off Washington, according to 1979 and 1980 index surveys, should continue or improve in 1981, 1982, and 1983--barring any large increases in catch rates. The Washington landings of nearly 2,400 t from August 1979 through July 1980 apparently did not adversely affect stocks. Nearly 1,300 t of this, or 54%, was landed in the August-October period of 1979, after which landings decreased sharply. During this same 3-mo period in 1980, total sablefish landings decreased to approximately 330 t, and landings for calendar year 1980 were approximately 1,300 t, which is less than half the landings made during calendar year 1979. As a result of these lower landings and the 10% increase in prerecruit-size sablefish between the 1979 and 1980 indexing surveys (Table 21, sablefish stocks should improve significantly off Washington in 1981, 1982, and 1983 unless landings are increased sharply.

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